EXERCISE 9.1 PAGE: 182

1. List five rational numbers between:

(i) -1 and 0

Solution:-

The five rational numbers between -1 and 0 are,

-1< (-2/3) < (-3/4) < (-4/5) < (-5/6) < (-6/7) < 0

(ii) -2 and -1

Solution:-

The five rational numbers between -2 and -1 are,

-2 < (-8/7) < (-9/8) < (-10/9) < (-11/10) < (-12/11) < -1

(iii) -4/5 and -2/3

Solution:-

The five rational numbers between -4/5 and -2/3 are,

-4/5 < (-13/12) < (-14/13) < (-15/14) < (-16/15) < (-17/16) < -2/3

(iv) -1/2 and 2/3

Solution:-

The five rational numbers between -1/2 and 2/3 are,

-1/2 < (-1/6) < (0) < (1/3) < (1/2) < (20/36) < 2/3

2. Write four more rational numbers in each of the following patterns:

(i) -3/5, -6/10, -9/15, -12/20, …..

Solution:-

In the above question, we can observe that the numerator and denominator are multiples of 3 and 5.

= (-3 × 1)/ (5 × 1), (-3 × 2)/ (5 × 2), (-3 × 3)/ (5 × 3), (-3 × 4)/ (5 × 4)

Then, the next four rational numbers in this pattern are,

= (-3 × 5)/ (5 × 5), (-3 × 6)/ (5 × 6), (-3 × 7)/ (5 × 7), (-3 × 8)/ (5 × 8)

= -15/25, -18/30, -21/35, -24/40 ….

(ii) -1/4, -2/8, -3/12, …..

Solution:-

In the above question, we can observe that the numerator and denominator are multiples of 1 and 4.

= (-1 × 1)/ (4 × 1), (-1 × 2)/ (4 × 2), (-1 × 3)/ (1 × 3)

Then, the next four rational numbers in this pattern are,

= (-1 × 4)/ (4 × 4), (-1 × 5)/ (4 × 5), (-1 × 6)/ (4 × 6), (-1 × 7)/ (4 × 7)

= -4/16, -5/20, -6/24, -7/28 ….

(iii) -1/6, 2/-12, 3/-18, 4/-24 …..

Solution:-

In the above question, we can observe that the numerator and denominator are multiples of 1 and 6.

= (-1 × 1)/ (6 × 1), (1 × 2)/ (-6 × 2), (1 × 3)/ (-6 × 3), (1 × 4)/ (-6 × 4)

Then, the next four rational numbers in this pattern are,

= (1 × 5)/ (-6 × 5), (1 × 6)/ (-6 × 6), (1 × 7)/ (-6 × 7), (1 × 8)/ (-6 × 8)

= 5/-30, 6/-36, 7/-42, 8/-48 ….

(iv) -2/3, 2/-3, 4/-6, 6/-9 …..

Solution:-

In the above question, we can observe that the numerator and denominator are the multiples of 2 and 3.

= (-2 × 1)/ (3 × 1), (2 × 1)/ (-3 × 1), (2 × 2)/ (-3 × 2), (2 × 3)/ (-3 × 3)

Then, the next four rational numbers in this pattern are,

= (2 × 4)/ (-3 × 4), (2 × 5)/ (-3 × 5), (2 × 6)/ (-3 × 6), (2 × 7)/ (-3 × 7)

= 8/-12, 10/-15, 12/-18, 14/-21 ….

3. Give four rational numbers equivalent to:

(i) -2/7

Solution:-

The four rational numbers equivalent to -2/7 are,

= (-2 × 2)/ (7 × 2), (-2 × 3)/ (7 × 3), (-2 × 4)/ (7 × 4), (-2 × 5)/ (7× 5)

= -4/14, -6/21, -8/28, -10/35

(ii) 5/-3

Solution:-

The four rational numbers equivalent to 5/-3 are,

= (5 × 2)/ (-3 × 2), (5 × 3)/ (-3 × 3), (5 × 4)/ (-3 × 4), (5 × 5)/ (-3× 5)

= 10/-6, 15/-9, 20/-12, 25/-15

(iii) 4/9

Solution:-

The four rational numbers equivalent to 5/-3 are,

= (4 × 2)/ (9 × 2), (4 × 3)/ (9 × 3), (4 × 4)/ (9 × 4), (4 × 5)/ (9× 5)

= 8/18, 12/27, 16/36, 20/45

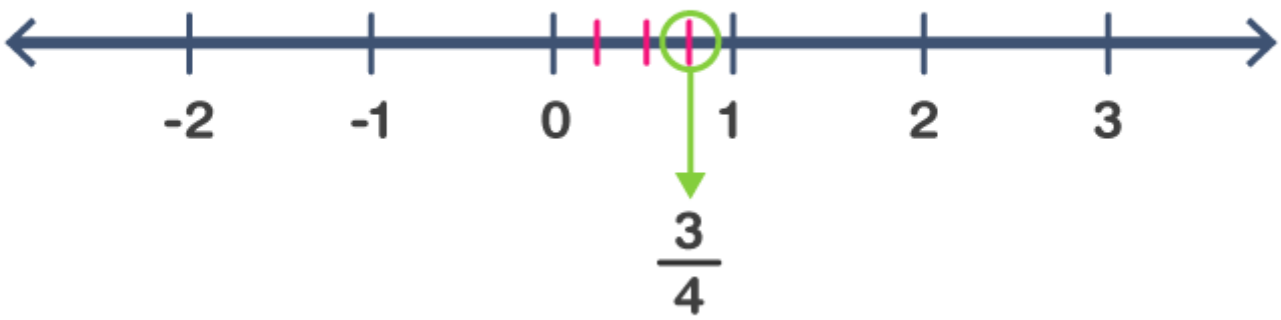
4. Draw the number line and represent the following rational numbers on it:

(i) ¾

Solution:-

We know that 3/4 is greater than 0 and less than 1.

∴ it lies between 0 and 1. It can be represented on the number line as,



(ii) -5/8

Solution:-

We know that -5/8 is less than 0 and greater than -1.

∴ it lies between 0 and -1. It can be represented on the number line as,

(iii) -7/4

Solution:-

Now, the above question can be written as,

= (-7/4) =
$-1\frac{3}{4}$

We know that (-7/4) is less than -1 and greater than -2.

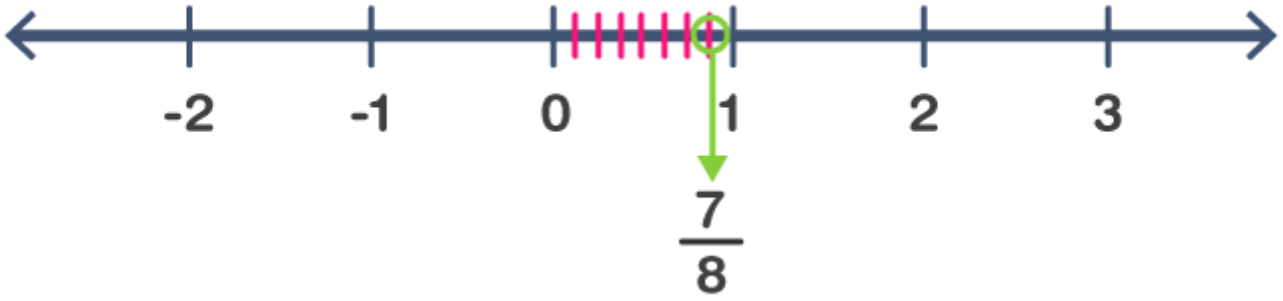
∴ it lies between -1 and -2. It can be represented on the number line as,

(iv) 7/8

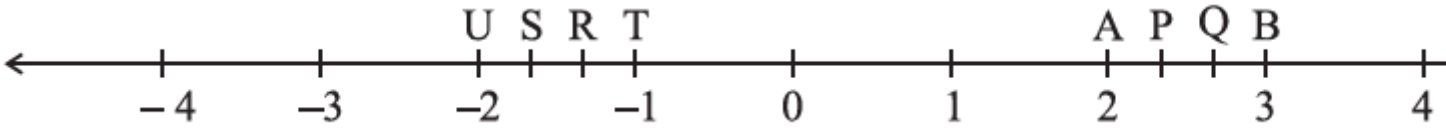
Solution:-

We know that 7/8 is greater than 0 and less than 1.

∴ it lies between 0 and 1. It can be represented on the number line as,



5. The points P, Q, R, S, T, U, A and B on the number line are such that, TR = RS = SU and AP = PQ = QB. Name the rational numbers represented by P, Q, R and S.



Solution:-

By observing the figure, we can say that,

The distance between A and B = 1 unit

And it is divided into 3 equal parts = AP = PQ = QB = 1/3

P = 2 + (1/3)

= (6 + 1)/ 3

= 7/3

Q = 2 + (2/3)

= (6 + 2)/ 3

= 8/3

Similarly,

The distance between U and T = 1 unit

And it is divided into 3 equal parts = TR = RS = SU = 1/3

R = – 1 – (1/3)

= (- 3 – 1)/ 3

= – 4/3

S = – 1 – (2/3)

= – 3 – 2)/ 3

= – 5/3

6. Which of the following pairs represents the same rational number?

(i) (-7/21) and (3/9)

Solution:-

We have to check if the given pair represents the same rational number.

Then,

-7/21 = 3/9

-1/3 = 1/3

∵ -1/3 ≠ 1/3

∴ -7/21 ≠ 3/9

So, the given pair does not represent the same rational number.

(ii) (-16/20) and (20/-25)

Solution:-

We have to check if the given pair represents the same rational number.

Then,

-16/20 = 20/-25

-4/5 = 4/-5

∵ -4/5 = -4/5

∴ -16/20 = 20/-25

So, the given pair represents the same rational number.

(iii) (-2/-3) and (2/3)

Solution:-

We have to check if the given pair represents the same rational number.

Then,

-2/-3 = 2/3

2/3= 2/3

∵ 2/3 = 2/3

∴ -2/-3 = 2/3

So, the given pair represents the same rational number.

(iv) (-3/5) and (-12/20)

Solution:-

We have to check if the given pair represents the same rational number.

Then,

-3/5 = – 12/20

-3/5 = -3/5

∵ -3/5 = -3/5

∴ -3/5= -12/20

So, the given pair represents the same rational number.

(v) (8/-5) and (-24/15)

Solution:-

We have to check if the given pair represents the same rational number.

Then,

8/-5 = -24/15

8/-5 = -8/5

∵ -8/5 = -8/5

∴ 8/-5 = -24/15

So, the given pair represents the same rational number.

(vi) (1/3) and (-1/9)

Solution:-

We have to check if the given pair represents the same rational number.

Then,

1/3 = -1/9

∵ 1/3 ≠ -1/9

∴ 1/3 ≠ -1/9

So, the given pair does not represent the same rational number.

(vii) (-5/-9) and (5/-9)

Solution:-

We have to check if the given pair represents the same rational number.

Then,

-5/-9 = 5/-9

∵ 5/9 ≠ -5/9

∴ -5/-9 ≠ 5/-9

So, the given pair does not represent the same rational number.

7. Rewrite the following rational numbers in the simplest form:

(i) -8/6

Solution:-

The given rational numbers can be simplified further,

Then,

= -4/3 … [∵ Divide both numerator and denominator by 2]

(ii) 25/45

Solution:-

The given rational numbers can be simplified further,

Then,

= 5/9 … [∵ Divide both numerator and denominator by 5]

(iii) -44/72

Solution:-

The given rational numbers can be simplified further,

Then,

= -11/18 … [∵ Divide both numerator and denominator by 4]

(iv) -8/10

Solution:-

The given rational numbers can be simplified further,

Then,

= -4/5 … [∵ Divide both numerator and denominator by 2]

8. Fill in the boxes with the correct symbol out of >, <, and =.

(i) -5/7 [ ] 2/3

Solution:-

The LCM of the denominators 7 and 3 is 21

∴ (-5/7) = [(-5 × 3)/ (7 × 3)] = (-15/21)

And (2/3) = [(2 × 7)/ (3 × 7)] = (14/21)

Now,

-15 < 14

So, (-15/21) < (14/21)

Hence, -5/7 [<] 2/3

(ii) -4/5 [ ] -5/7

Solution:-

The LCM of the denominators 5 and 7 is 35

∴ (-4/5) = [(-4 × 7)/ (5 × 7)] = (-28/35)

And (-5/7) = [(-5 × 5)/ (7 × 5)] = (-25/35)

Now,

-28 < -25

So, (-28/35) < (- 25/35)

Hence, -4/5 [<] -5/7

(iii) -7/8 [ ] 14/-16

Solution:-

14/-16 can be simplified further,

Then,

7/-8 … [∵ Divide both numerator and denominator by 2]

So, (-7/8) = (-7/8)

Hence, -7/8 [=] 14/-16

(iv) -8/5 [ ] -7/4

Solution:-

The LCM of the denominators 5 and 4 is 20

∴ (-8/5) = [(-8 × 4)/ (5 × 4)] = (-32/20)

And (-7/4) = [(-7 × 5)/ (4 × 5)] = (-35/20)

Now,

-32 > – 35

So, (-32/20) > (- 35/20)

Hence, -8/5 [>] -7/4

(v) 1/-3 [ ] -1/4

Solution:-

The LCM of the denominators 3 and 4 is 12

∴ (-1/3) = [(-1 × 4)/ (3 × 4)] = (-4/12)

And (-1/4) = [(-1 × 3)/ (4 × 3)] = (-3/12)

Now,

-4 < – 3

So, (-4/12) < (- 3/12)

Hence, 1/-3 [<] -1/4

(vi) 5/-11 [ ] -5/11

Solution:-

Since, (-5/11) = (-5/11)

Hence, 5/-11 [=] -5/11

(vii) 0 [ ] -7/6

Solution:-

Since every negative rational number is less than 0,

We get:

= 0 [>] -7/6

9. Which is greater in each of the following:

(i) 2/3, 5/2

Solution:-

The LCM of the denominators 3 and 2 is 6

(2/3) = [(2 × 2)/ (3 × 2)] = (4/6)

And (5/2) = [(5 × 3)/ (2 × 3)] = (15/6)

Now,

4 < 15

So, (4/6) < (15/6)

∴ 2/3 < 5/2

Hence, 5/2 is greater.

(ii) -5/6, -4/3

Solution:-

The LCM of the denominators 6 and 3 is 6

∴ (-5/6) = [(-5 × 1)/ (6 × 1)] = (-5/6)

And (-4/3) = [(-4 × 2)/ (3 × 2)] = (-12/6)

Now,

-5 > -12

So, (-5/6) > (- 12/6)

∴ -5/6 > -12/6

Hence, – 5/6 is greater.

(iii) -3/4, 2/-3

Solution:-

The LCM of the denominators 4 and 3 is 12

∴ (-3/4) = [(-3 × 3)/ (4 × 3)] = (-9/12)

And (-2/3) = [(-2 × 4)/ (3 × 4)] = (-8/12)

Now,

-9 < -8

So, (-9/12) < (- 8/12)

∴ -3/4 < 2/-3

Hence, 2/-3 is greater.

(iv) -¼, ¼

Solution:-

The given fraction is like friction,

So, -¼ < ¼

Hence ¼ is greater,

(v)
$-3\frac{2}{7}$,
$-3\frac{4}{5}$

Solution:-

First, we have to convert mixed fractions into improper fractions,

$-3\frac{2}{7}$= -23/7

$-3\frac{4}{5}$= -19/5

Then,

The LCM of the denominators 7 and 5 is 35

∴ (-23/7) = [(-23 × 5)/ (7 × 5)] = (-115/35)

And (-19/5) = [(-19 × 7)/ (5 × 7)] = (-133/35)

Now,

-115 > -133

So, (-115/35) > (- 133/35)

∴
$-3\frac{2}{7} > -3\frac{4}{5}$

Hence,
$-3\frac{2}{7}$ is greater.

10. Write the following rational numbers in ascending order:

(i) -3/5, -2/5, -1/5

Solution:-

The given rational numbers are in the form of like fractions,

Hence,

(-3/5)< (-2/5) < (-1/5)

(ii) -1/3, -2/9, -4/3

Solution:-

To convert the given rational numbers into like fractions, we have to find the LCM,

The LCM of 3, 9, and 3 is 9

Now,

(-1/3)= [(-1 × 3)/ (3 × 9)] = (-3/9)

(-2/9)= [(-2 × 1)/ (9 × 1)] = (-2/9)

(-4/3)= [(-4 × 3)/ (3 × 3)] = (-12/9)

Clearly,

(-12/9) < (-3/9) < (-2/9)

Hence,

(-4/3) < (-1/3) < (-2/9)

(iii) -3/7, -3/2, -3/4

Solution:-

To convert the given rational numbers into like fractions, we have to find LCM,

The LCM of 7, 2, and 4 is 28

Now,

(-3/7)= [(-3 × 4)/ (7 × 4)] = (-12/28)

(-3/2)= [(-3 × 14)/ (2 × 14)] = (-42/28)

(-3/4)= [(-3 × 7)/ (4 × 7)] = (-21/28)

Clearly,

(-42/28) < (-21/28) < (-12/28)

Hence,

(-3/2) < (-3/4) < (-3/7)